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Planet in slight fog. On removing my eye to the larger instrument, I found it was not in sight.

Nov. 3	II.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	10 28 2
			$2\frac{1}{4}$ „	10 28 39
Nov. 4	I.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	6 46 39
			$2\frac{1}{4}$ „	6 46 55
Nov. 20	I.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	5 7 19
			$2\frac{1}{4}$ „	5 7 29
Nov. 27	I.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	7 2 58
			$2\frac{1}{4}$ „	7 3 18
Nov. 28	II.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	7 33 23
			$2\frac{1}{4}$ „	7 33 39
	III.	Ec. D.	With $2\frac{1}{4}$ inch, last visibility	11 44 48
			$3\frac{1}{4}$ „	11 45 35
Planet in slight haze.				
Dec. 20	I.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	7 19 33
			$2\frac{1}{4}$ „	7 19 48
Dec. 30	II.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	7 16 55
			$2\frac{1}{4}$ „	7 17 13
1881, Jan. 6	II.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	9 54 2
			$2\frac{1}{4}$ „	9 54 32
Jan. 31	II.	Ec. R.	With $3\frac{1}{4}$ inch, first visibility	7 3 29
			$2\frac{1}{4}$ „	7 4 23

Abbenhall Rectory, Gloucester,
1881, March 10.

Observations of the Phenomena of the Satellites of Jupiter, with a few Transits of the "Red Spot;" also a few observations of the brighter Satellites of Saturn, made at the Observatory of Mr. Edward Crossley, F.R.A.S. By Mr. J. Gledhill, F.R.A.S.

The instrument used is the equatorial refractor of $9\frac{1}{3}$ -in. aperture. In the observations of the phenomena of *Jupiter's* satellites the full aperture and powers 240 and 470 were used. The transits of the "red spot" and the phenomena of *Saturn's* satellites were observed with the Simms micrometer, powers 280 and 460; in the former observations the equatorial diameter of *Jupiter* was measured, the webs set at half the value, and one kept on the eastern or western limb of the planet at right angles to the planet's equator: in the latter a web was placed at right angles to the plane of the ring, and at one of its ends; or the semi-diameter of the ball was found, and the webs placed as in the transits of the "red spot."

Day of Observation.	Satellite.	Phenomenon.	Mean Solar Time of Observation.			Mean Solar Time from N. A.			Remarks.
			h	m	s	h	m	s	
1880, Aug. 31	II.	Oc. R. External contact	12	57	0	12	58	0	Good definition.
Sept. 3	(a) III.	Ec. D. Began to fade	11	14	36	11	17	25	Good definition.
		Disappeared	11	18	42				
7	(b) II.	Ec. D. Began to fade	11	10	0				Definition bad.
	(c)	Half gone	11	11	20	11	11	1	
	(d)	Just disappeared	11	12	50				
17	I.	Ec. D. Fading	9	36	0	9	38	47	Much cloud.
		Invisible	9	38	30				
18	I.	Sh. E. Just off	9	8	0	9	9	0	Wind and clouds.
26	I.	Oc. R. External contact	8	31	0	8	31	0	Much motion.
Oct. 2	(e) II.	Ec. D.	8	12	53				Definition poor.
	(f)		13	53		8	14	6	
	(g)		15	38					
	I.	Sh. I. Notch first seen	10	44	0	10	43	0	Bad definition.
	I.	Tr. I. First contact	10	49	0				
		Bisection	10	52	0	10	51	0	
		Inner contact	10	53	0				
	II.	Oc. R. Last contact	11	5	0	11	5	0	
Oct. 3	(h) I.	Ec. D. Disappearance	7	57	6	7	57	26	

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Day of Observation.	Satellite.	Phenomenon.	Mean Solar Time of Observation. h m s	Mean Solar Time from N. A. h m s	Remarks.
Oct. 3	(i) I.	Oc. R. First seen	10 12 0		
		Half off	10 12 30	10 15 0	
	(j) III.	Ext. contact	10 14 30		
		Ec. R. First seen	9 45 12	9 50 19	Good definition.
9	(k) II.	Oc. D. First contact	10 40 0		
	(l)	Bisected	10 42 0	10 40 0	
	(m)	Disappearance	10 44 0		
	(n) I.	Oc. D. First contact	9 44 0		
	(o)	Bisected	46 30	9 46 0	
	(p)	Inner contact	48 0		
	(q) I.	Ec. R. First seen	8 26 28	8 26 53	Good definition.
	II.	Tr. I. First contact	11 58 0		Good definition.
Nov. 1	(r)	Bisected	11 59 0	12 0 0	
		Second contact	12 0 0		
	(s) I.	Tr. I. First contact	12 14 0		
		Second contact	12 16 0	12 13 0	
	II.	Oc. D. First contact	6 28 0	6 30 0	Very bad sky.
		Disappearance	6 34 0		
	I.	Tr. I. First contact	6 37 0	6 39 0	Violent boiling.
		Second contact	6 44 0		

x

Day of Observation.	Satellite.	Phenomenon.	Mean Solar Time of Observation. h m s	Mean Solar Time from N. A. h m s	Remarks.
Nov. 3	III.	Tr. I. First contact	6 51 0	6 54 0	
		Second contact	7 5 0		
	I.	Sh. I. Just within	7 21 0	7 19 0	
	I.	Tr. E. Inner contact	8 48 30		Good definition now.
		Bisected	8 50 30	8 52 0	Good observations; the last thought the best.
	(t) III.	Outer contact	8 52 0		Uncertain.
		Tr. E. Inner contact	9 8 0		Fairly good.
	(u)	Bisected	9 15 0	9 21 0	Fairly good.
	(v) I.	Just off	9 22 0		Definition not so good.
		Sh. E. Inner contact	9 27 0	9 33 0	
Nov. 4	III.	Just off	9 32 0		
		Sh. I. Bisected	9 42 0	9 40 0	
	II.	Just within	9 44 0		
		Ec. R. First seen	10 25 30	10 28 43	
	III.	Sh. E. Inner contact	12 5 0		
		Half off	12 8 0	12 11 0	
	I.	Just off	12 9 30		Bad sky.
		Ec. R. First seen	6 46 25	6 46 42	
	I.	Tr. I. First contact	10 13 0	10 12 0	Good sky; good observation.
		Fully on disk	10 16 0		

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Day of Observation.	Satellite.	Phenomenon.	Mean Solar Time of Observation. h m s	Mean Solar Time from N. A. h m s	Remarks.
Nov. 18	I.	Oc. D. First contact	7 27 0	7 27 0	Good observation.
		Disappearance	7 29 0		
	I.	Ec. R. First seen	10 38 7	10 38 6	Good observation.
19	I.	Sh. I. Just on	5 40 0	5 39 0	
	II.	Tr. I. First contact	5 50 0	5 54 0	Rather uncertain.
		Bisection	5 53 0		Good.
		Second contact	5 55 0		Good.
	I.	Tr. E. Inner contact	6 47 0		Not so good.
		Bisection	6 50 0	6 53 0	Good.
		Ext. contact	6 53 0		Best observation.
	I.	Sh. E. Inner contact	7 47 0		Good.
		Bisection	7 49 0	7 53 0	Fair.
		Just off	7 51 0		Good.
	II.	Sh. I. Half on	7 54 0	7 53 0	Fair.
			7 56 0		Good.
	II.	Tr. E. Inner contact	8 24 0		Fair.
		Bisection	8 27 0	8 34 0	Good.
		Just off	8 31 0		Good.
	II.	Sh. E. Inner contact	10 28 0	10 33 0	
		Just off	10 31 0		

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Day of Observation.	Satellite.	Phenomenon.	Mean Solar Time of Observation.			Mean Solar Time from N.A.			Remarks.
			h	m	s	h	m	s	
Nov. 20	I.	Ec. R. First seen	5	7	1	5	7	7	Good observation.
	II.	Ec. R. First seen	4	57	4	4	58	4	
	I.	Oc. D. First contact	9	13	0				Good definition.
		Bisection	9	15	0	9	16	0	
26		Disappearance	9	17	0				Good.
	I.	Tr. I. First contact	6	27	0				
			6	29	30	6	27	0	Fair.
			6	31	0				Good.
	I.	Sh. I. Bisection	7	34	0	7	34	0	
		Just within	7	36	0				Clouding.
27	II.	Tr. I. First contact	8	13	0	8	13	0	
	II.	Tr. E. Inner contact	10	51	0				
		Half off	10	54	0	11	0	0	
		Just off	10	57	0				
	I.	Ec. R. First seen	7	2	32	7	2	56	
	II.	Ec. R. First seen	7	34	20	7	34	3	
28	III.	Oc. R. Outer contact	9	29	0	9	35	0	
	I.	Oc. D. First contact	11	4	0				Fair sky.
		Bisection	11	6	0	11	6	0	
		Last seen	11	8	0				
Dec. 2									

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Day of Observation.	Satellite.	Phenomenon.	Mean Solar Time of Observation. h m s	Mean Solar Time from N. A. h m s	Remarks.
Dec. 11	I.	Oc. D. First contact	7 25 0	7 26 0	Bad definition.
		Last seen	7 28 0		
	I.	Ec. R. First seen	10 54 43	10 54 43	
12	I.	Tr. E. Just off	6 54 0	6 52 0	Bad sky.
	II.	Oc. D. Just gone	7 37 0	7 36 0	
14	II.	Sh. E. Inner contact	7 46 0	7 50 0	Bad sky.
1881, Jan. 13	II.	Oc. D. Outer contact	7 14 0		Good.
		Half gone	7 16 0	7 14 0	Fairly good.
		Gone	7 18 0		(Good.

Notes.

- (a) Power 227 on the micrometer; probably the light began to fade a little (a few seconds) later than 11^h 14^m 36^s.
 (b) and (c) Uncertain. (d) Good; power 500. (e) Fair. (f) Uncertain. (g) Good; power 282.
 (h) The satellite was fully 2^m in disappearing; it was very near the limb of *Jupiter*. (k) and (l) may be 1^m in error.
 (i) Time uncertain. (j) The satellite was fully 3^m in attaining its full brightness. (q) The satellite was about 4^m in attaining full brightness.
 (m) Good. (n) and (p) Good. (o) Uncertain. (u) and (v) Fairly good.
 (r) Uncertain. (s) Not later than this. (t) Uncertain.

Transits of the "Red Spot" of Jupiter.

1880, Aug. 31.

Preceding end:

	h	m
13	10	not up.
13	15	central?
13	20	past.

Centre:

	h	m
13	40	not up yet.
13	43	central?

Clouds passed and prevented further observation.

1880, Sept. 3. Definition bad.

Preceding end:

	h	m
10	55 ±	judged central.

Centre:

	h	m
11	10	not up yet.
11	14	central.
11	18	certainly past.

Following end:

	h	m
11	38	not quite up.
11	40	central.
11	44	past.

1880, Sept. 18. Wild night: no definition.

Following end:

	h	m
9	0	not up.
9	10	certainly past.

1880, Oct. 2. Definition not good.

Preceding end:

	h	m
9	27	not up.
9	34	just passed.

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Centre:

h m
9 54 not up.
9 59 central.
10 4 just past.

Following end:

h m
10 25 not up.
10 29 central.
10 32 past.

1880, Oct. 9. Good sky.

Preceding end:

h m
10 5 not up yet.
10 7 to 10^h 11^m uncertain.
10 13 central.
10 15 past.

Centre:

h m
10 40 not up.
10 42 to 10^h 44^m uncertain.
10 47 past.

Following end:

h m
11 10 not up.
11 12 not up.
11 13 to 11^h 14^m uncertain.
11 17 certainly past.

1880, Oct 11.

Preceding end:

h m
11 47 not up.
11 48 to 11^h 50^m uncertain.
11 52 judged central.
11 55 past.

Centre:

h m
12 18 not up.
12 20 to 12^h 23^m uncertain.
12 25 central.
12 27 probably just past.
12 29 certainly past.

Following end :

h m
13 17 not up.
13 23 to 13^b 25^m uncertain.
13 27 judged central.
13 30 past.

1880, Oct. 19.

Preceding end :

h m
8 23 not up.
8 24 uncertain.
8 25 central?
8 28 central?
8 30 past.

Centre :

h m
8 50 not up.
8 53 central?
8 55 central?
8 56 central?
8 58 certainly past.

Following end :

h m
9 21 not up.
9 23 to 9^b 25^m central?
9 27 certainly past.

1880, Oct. 21. Definition very bad.

Preceding end :

h m
10 5 not up.
10 7 to 10^b 10^m central?
10 12 past.

Centre :

h m
10 36 central?

Following end :

h m
11 1 to 11^b 3^m central?
11 5 past.

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1880, Nov. 19.

Preceding end:

h	m	
8	45	not up yet.
8	50	not up yet.
8	58	central?
9	0	central?
9	3	past.

Centre:

h	m	
9	20	not up.
9	22 to 9 ^h 24 ^m	uncertain.
9	26	central.
9	30	past.

Following end:

h	m	
9	45	not up.
9	50	up?
9	52	up?
9	55	past.

1880, Nov. 20. Good definition.

Centre:

h	m	
5	13	not up.
5	15	up?
5	16	up?
5	18	central.
5	19	central.
5	20	past.

1880, Nov. 21. Definition not good.

Centre:

h	m	
6	50	not up.
6	55	central?
7	0	central.
7	5	past.

Following end:

h	m	
7	20	probably central.

1880, Dec. 18. Stormy; planet seen at intervals.

Preceding end:

h	m	
Central at 7	50 ±	.

1881, Jan. 14. Definition good till the centre had passed, then very poor.

Preceding end:

h m h m
5 10 to 5 15 central; not up at
5 5, past at 5^h 20^m.

Centre:

h m h m
It passed between 5 40 and 5 45.

Following end:

h m h m
It passed between 6 10 and 6 15.

Observations of Saturn's Satellites.

1880, Sep. 3. Full aperture, $9\frac{1}{3}$ inches, always used. Good definition.

Tethys at inf. conjunction with the following end of the ring:

h m
11 55 not yet up.
12 3 on the web at right angles to axis of ring.
12 8 certainly past.

The satellite is steadily visible in the dark field: a little illumination increases the visibility.

The mist thickened and rendered the conjunction with the centre of the ball uncertain. It occurred between 15^h 30^m and 15^h 40^m.

1880, Oct. 23.

Rhea in conjunction (south) with the centre of the ball:

h m
9 40 not up.
9 45 uncertain; probably up.
9 50 uncertain; probably up.
10 0 certainly past.

Powers 240 and 470.

1880, Nov. 1.

Rhea in conjunction (south) with centre of ball:

h m
10 30 not yet up.
10 32 uncertain; probably up.
10 32 uncertain; probably up.
10 40 just past.

Full red illumination used: good sky.